What is claimed is:

1. A method for determining shape data for a workpiece, the workpiece comprising at least a first portion and the shape data to be determined being for a second portion of the workpiece, the method comprising:

providing shape data of the first portion of the workpiece;

providing shape data of a first template portion and a second template portion of a reference template, the first template portion corresponding to the first portion of the workpiece, and the second template portion corresponding to the second portion of the workpiece, the second template portion having a shape related to the shape to be determined for the second portion of the workpiece; and

determining the shape data of the second portion of the workpiece, based on the shape data of the first template portion and the second template portion of the reference template and the shape data of the first portion of the workpiece.

2. A method as claimed as in claim 1, further comprising generating surface shape data for the second portion of the workpiece based on the determined shape data of the second portion of the workpiece.

3. A method as claimed in claim 1, wherein determining the shape data of the second portion of the workpiece comprises calculating a target set of offsets.

4. A method as claimed in claim 3, wherein determining the shape data of the second portion of the workpiece further comprises using the target set of offsets with the shape data of the first portion of the workpiece.

5. A method as claimed in claim 4, wherein using the target set of offsets comprises adding the target set of offsets to the shape data of the first portion of the workpiece.

6. A method as claimed in claim 4, wherein calculating a target set of offsets comprises calculating a first set of offsets, between the shape data of the first and second template portions of the reference template.

7. A method as claimed in claim 6, wherein calculating a target set of offsets further comprises:

calculating a second set of offsets, within the shape data of the first portion of the reference template, and a third set of offsets, within the shape data of the first portion of the workpiece; and

using the second and third sets of offsets, together with the first set of offsets and the shape data of the first portion of the workpiece to determine the shape data of the second portion of the workpiece.

8. A method as claimed as in claim 7, wherein, in using the first, second and third sets of offsets, the target, fourth set of offsets is generated representing the offsets between the shape data of the first and second portions of the workpiece.

9. A method as claimed in claim 8, wherein the first, second and third sets of offsets are sets of angles and the fourth set of offsets is generated based on the difference between corresponding angles within the first and second sets of offsets being added to the corresponding angles of the third set of offsets.

10. A method as claimed in claim 8, wherein the fourth set of offsets is generated based on the ratio between corresponding offsets within the first and second sets of offsets being the same as that between corresponding corresponding offsets between the fourth and third sets of offsets.

11. A method as claimed in claim 3, wherein

calculating a target set of offsets comprises calculating a first set of offsets, between the shape data of the first template portion of the reference template and the first portion of the workpiece; and

determining the shape data of the second portion of the workpiece further comprises using the target set of offsets and the shape data of the second template portion of the workpiece to determine the shape data of the second portion of the workpiece.

12. A method as claimed as in claim 7, wherein the shape data of the workpiece and reference template comprise shape data on layers of the workpiece and reference template.

13. A method as claimed as in claim 12, wherein the shape data on layers of the workpiece and reference template are obtained through scanning the first portion of the workpiece and the first and second portions of the reference template in layers.

14. A method as claimed as in claim 12, wherein the first, second and third sets of offsets each comprise sets of offsets between corresponding points within series of layers within the workpiece and template.

15. A method as claimed in claim 1, wherein providing shape data of the first portion of the workpiece and of the first and second portions of the template further comprises calculating neutral lines of the first and second portions of the reference template and of the first portion of the workpiece based on their shape data.

16. A method as claimed as in claim 15, wherein determining the shape data of the second portion of the workpiece comprises determining the neutral line of the second portion of the workpiece, based on the neutral lines of the first and second portions of the reference template and of the first portion of the workpiece.

17. A method as claimed as in claim 16, wherein determining the shape data of the second portion of the workpiece further comprises determining the positions of points on the surface of the second portion of the workpiece, based on the neutral line of the second portion of the workpiece and points on the surfaces of the first portion of the workpiece.

18. A method as claimed as in claim 17, wherein determining the positions of points on the surface of the second portion of the workpiece is further based on points on the surfaces of the first and second portions of the reference template.

19. A method as claimed as in claim 17, wherein

the points on the surface of the second portion of the workpiece whose positions are determined are points corresponding to selected points on the neutral line of the second portion of the workpiece; and

for each selected point on the neutral line of the second portion of the workpiece, the position of the corresponding point on the surface of the second portion of the workpiece is determined based on ratios of distances from the neutral line and the surface for corresponding neutral line points in the first used portion of the workpiece.

20. A method as claimed as in claim 1, wherein the workpiece is a blade.

21. A method as claimed as in claim 20, wherein the blade is a turbine blade.

22. A method as claimed as in claim 1, wherein the workpiece is a deformed version of the reference template.

23. A method as claimed in claim 1, wherein the workpiece has a surface with a complex curve and the shape data on the second portion of the workpiece comprises data on said complex curve.

24. Apparatus for determining shape data for a workpiece based on shape data of a reference template, the workpiece comprising at least a first portion and the shape data to be determined being for a second portion of the workpiece, and the reference template comprising a first template portion corresponding to the first portion of the workpiece and a second template portion corresponding to the second portion of the workpiece, and the second template portion having a shape related to the shape to be determined for the second portion of the workpiece, the apparatus comprising:

a first input for receiving shape data of the first portion of the workpiece;

a second input for receiving shape data of the first and second template portions of the reference template; and

a processor for determining the shape data of the second portion of the workpiece, based on the shape data of the first template portion and the second template portion of the reference template and the shape data of the first portion of the workpiece.

25. Apparatus as claimed as in claim 24, wherein the processor is further operable to generate surface shape data for the second portion of the workpiece based on the determined shape data of the second portion of the workpiece.

26. Apparatus as claimed as in claim 24, wherein, in determining the shape data of the second portion of the workpiece, the processor is further operable to calculate a target set of offsets.

27. Apparatus as claimed as in claim 26, wherein, in determining the shape data of the second portion of the workpiece, the processor is further operable to use the target set of offsets with the shape data of the first portion of the workpiece.

28. Apparatus as claimed as in claim 27, wherein, in using the target set of offsets, the processor is further operable to add the target set of offsets to the shape data of the first portion of the workpiece.

29. Apparatus as claimed as in claim 27, wherein, in calculating a target set of offsets, the processor is further operable to calculate a first set of offsets, between the shape data of the first and second template portions of the reference template.

30. Apparatus as claimed as in claim 29, wherein, in calculating a target set of offsets, the processor is further operable to:

calculate a second set of offsets, within the shape data of the first portion of the reference template, and a third set of offsets, within the shape data of the first portion of the workpiece; and

use the second and third sets of offsets, together with the first set of offsets and the shape data of the first portion of the workpiece to determine the shape data of the second portion of the workpiece.

31. Apparatus as claimed as in claim 30, wherein, in using the first, second and third sets of offsets, the processor is further operable to generate the target, fourth set of offsets, representing the offsets between the shape data of the first and second portions of the workpiece.

32. Apparatus as claimed as in claim 31, wherein the first, second and third sets of offsets are sets of angles and the processor is further operable to generate the fourth set of offsets based on the difference between corresponding

angles within the first and second sets of offsets being added to the corresponding angles of the third set of offsets.

33. Apparatus as claimed as in claim 30, wherein the shape data of the workpiece and reference template comprise shape data on layers of the workpiece and reference template.

34. Apparatus as claimed as in claim 33, further comprising a scanner for scanning the first portion of the workpiece and the first and second portions of the reference template in layers to obtain the shape data of the workpiece and reference template.

35. Apparatus as claimed as in claim 33, wherein the first, second and third sets of offsets each comprise sets of offsets between corresponding points within adjacent layers.

36. Apparatus as claimed as in claim 34, wherein the processor is further operable, for individual scanned layers of the reference template and workpiece, to separate data on the scanned layer into two portions of data, to filter out repeat data of the scanned layer, and to insert data to form uniform scan data on the scanned layer.

37. Apparatus as claimed as in claim 24, wherein the processor is further operable to calculate neutral lines of the first and second portions of the reference template and of the first portion of the workpiece based on their shape data.

38. Apparatus as claimed as in claim 37, wherein, in determining the shape data of the second portion of the workpiece, the processor is further operable to determine the neutral line of the second portion of the workpiece, based on the neutral lines of the first and second portions of the reference template and of the first portion of the workpiece.

39. Apparatus as claimed as in claim 38, wherein, in determining the shape data of the second portion of the workpiece, the processor is further operable to determine the positions of points on the surface of the second portion of the

workpiece, based on the neutral line of the second portion of the workpiece and points on the surfaces of the first portion of the workpiece.

40. Apparatus as claimed as in claim 39, wherein

the points on the surface of the second portion of the workpiece whose positions are determined are points corresponding to selected points on the neutral line of the second portion of the workpiece; and

the processor is further operable, for each selected point on the neutral line of the second portion of the workpiece, to determine the position of the corresponding point on the surface of the second portion of the workpiece based on ratios of distances from the neutral line and the surface for corresponding neutral line points in the first used portion of the workpiece.

41. A computer program product for determining shape data for a workpiece based on shape data of a reference template, the workpiece comprising at least a first portion and the shape data to be determined being for a second portion of the workpiece, and the reference template comprising a first template portion corresponding to the first portion of the workpiece and a second template portion corresponding to the second portion of the workpiece, and the second template portion having a shape related to the shape to be determined for the second portion of the workpiece, the computer program product comprising a computer usable medium having computer readable program code embodied therein, the computer readable program code comprising:

computer readable program code for receiving shape data of the first portion of the workpiece;

computer readable program code for receiving shape data of the first and second template portions of the reference template; and

computer readable program code for determining the shape data of the second portion of the workpiece, based on the shape data of the first template portion and the second template portion of the reference template and the shape data of the first portion of the workpiece.

42. A method of determining the head and tail points of a complex curve, comprising determining a second derivative curve for the complex curve and selecting the positions on the complex curve corresponding to the two lowest

positions on the second derivative curve as the head and tail points of the complex curve.

43. A method as claimed in claim 42, wherein the complex curve is an aerofoil shape.

44. A method of determining a neutral line within a body, the body having first and second sides and first and second ends, the first and second sides extending from between the first and second ends of the body, the neutral line to extend between the first and second sides and from the first end to the second end, the method comprising:

providing a first series of points, on a first line, on the first side of the body, from the first end to the second end, the first series containing a first number of points;

providing a second series of points, on a second line, on the second side of the body, from the first end to the second end, the second series containing the first number of points, where the ratio of the distance between adjacent points in the second series to the length of the second line between the first and second ends is the same as the ratio of the distance between corresponding adjacent points in the first series to the length of the first line between the first and second ends;

determining midpoints between corresponding points within the first and second series; and

using the determined midpoints to derive the neutral line.

45. A method as claimed in claim 44, wherein the neutral line is determined as passing through the determined midpoints.

46. A method as claimed in claim 44, wherein the body has an aerofoil shape.

47. A method of determining individual points along a neutral line within a body, the body having first and second surface sides and first and second ends, the first and second sides extending from between the first and second ends of the body, the neutral line to extend between the first and second sides and from the first end to the second end, the method comprising:

(a) determining a first intersecting line intersecting the first and second sides at first and second intersection points;

(b) determining a midpoint of the most recently determined intersecting line between the most recently determined intersection points;

(c) determining the midpoint to be a further point on the neutral line;

(d) determining a temporary point at the end of a vector extending from the further point on the neutral line, in a direction which is an average of the direction of the first and second sides at the most recently determined intersection points, for a first predetermined distance;

(e) determining a second intersecting line intersecting the first and second sides at third and fourth intersection points, the second intersecting line passing through the first temporary point perpendicular to the first vector; and

(f) reverting to step (b).

48. A method as claimed in claim 47, further comprising:

providing a first series of points, on a first line, on the first side of the body, from the first end to the second end, the first series containing a first number of points; and

providing a second series of points, on a second line, on the second side of the body, from the first end to the second end, the second series containing the first number of points;

wherein the ratio of the distance between adjacent points in the second series to the length of the second line between the first and second ends is the same as the ratio of the distance between corresponding adjacent points in the first series to the length of the first line between the first and second ends.

49. A method according to claim 48, wherein determining a first intersecting line comprises:

determining a first vector, extending from the first end of the body through a first predetermined distance in a first direction.

50. A method according to claim 49, wherein the first direction is the average of all the vectors connecting adjacent points in the first series of points, on the first side, from the first end to a first predetermined point, and all the vectors connecting adjacent points in the second series of points, on the second side, from the first end to a second predetermined point, the first and second

predetermined points being the same number of points along the first and second series of points, respectively.

51. A method according to claim 47, further comprising stopping the process when the temporary point is determined to fall on or outside the surface of the body.